

Non-Line-of-Sight Launch System

Rod Summers



The Non-Line-of-Sight Launch System (NLOS-LS) provides enabling lethality for the Army's Future Combat Systems (FCS) program. The NLOS-LS, one of 19 FCS Core Systems, consists of a family of missiles and a highly deployable, platform-independent Container Launch Unit (C/LU) with self-contained tactical fire control electronics and software for remote and unmanned operations.



The NLOS-LS Increment I configuration will consist of Precision Attack Missiles (PAM) focused on defeating armored and command and control targets and Loitering Attack Missiles (LAM) focused on defeating non-armored fleeting, high-value targets as well as supporting both targeting information

and battle damage assessment (BDA). Each missile will be vertically launched directly from the C/LU based on fire missions received via the FCS Unit of Action (UA) network and be capable of being updated in-flight by the network via on-board Joint Tactical Radio Set Cluster 5 radios. Vertical launch capability enhances deployability and delivers the ability to engage a wide spectrum of targets in diverse environments and terrain. Future increments may include additional missiles variants such as air defense and nonlethal missiles.

Current operational plans are to field 60 C/LUs with each of the 15 FCS UAs. Each C/LU will consist of a computer and communications system



and 15 missiles (PAM and LAM). The first C/LUs will be deployed by the decade's end to meet FCS Initial Operational Capability.

PAM is a modular, multimission, guided missile with two trajectories — a direct-fire or fast-attack trajectory and a boost-glide trajectory. The missile will receive target information prior to launch and can receive and respond to target location updates during flight. The PAM will support laser-designated, laser-anointed and autonomous operation modes and will be capable of transmitting near-real-time information in the form of target imagery prior to impact. PAM

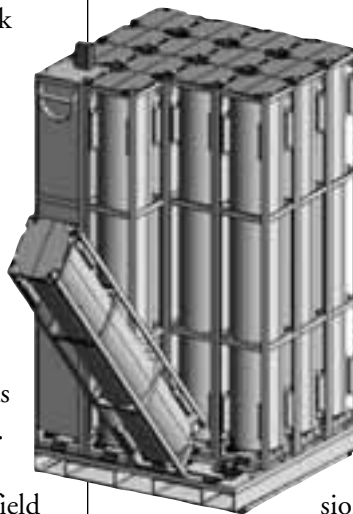
is being designed to defeat heavy armored targets.

LAM will provide imagery for area search, surveillance, targeting and BDA and could serve as an airborne radio transmission platform for other system missiles, as well identifying high-payoff targets for missile attack. LAM will be capable

of flying to extended ranges with significant loiter time at its maximum range. Mission data can be preprogrammed or changed in flight and imagery information can be provided to multiple common ground systems. Current target requirements for LAM are for high-fleeting, high-value targets.

C/LU serves as the basic missile shipping container and vertical launcher. It contains the PAM and LAM as well as the computer and communications system. It will accept remote commands to launch, test for availability and conduct firing operations without the use of an attendant crew. NLOS-LS is a platform-independent transported system.

This NLOS-LS technology is being developed by Lockheed Martin Missiles and Fire Control of Dallas (LMMFC-D), TX, and Raytheon Corp. of Tucson, AZ, under a Defense Advanced Research Projects Agency (DARPA) Concept Technology Demonstration contract. In September 2002, the Program Executive Office for Tactical Missiles established the NLOS-LS Task Force (TF) to manage the NLOS-LS technology's transition from DARPA to the Army and to manage the program for the Army until an NLOS-LS project office could be established. Approximately



6 months after the TF's establishment, pre-system development and demonstration (SDD) contracts were awarded to LMMFC-D and Raytheon to facilitate the transition and mitigate risk associated with the SDD contract award planned for early FY04. A project manager for NLOS-LS has been approved for FY05 and the TF will continue to manage the effort until then.

In May 2003, Lockheed Martin Corp. and the Raytheon Corp. formed Netfires Limited Liability Company (LLC) to develop the NLOS-LS. On Aug. 6, 2003, the U.S. Army Aviation and Missile Command issued a request for proposal to Netfires LLC for the NLOS-LS SDD contract. Contract award is planned for the second quarter of FY04.

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Unmanned Ground Vehicles

COL Terry Griffin (USMC)



There are three unmanned ground vehicles (UGVs) in the Future Combat Systems (FCS) program. Each UGV program is managed by an integrated process team consisting of the Lead Systems Integrator and government personnel located in Huntsville, AL. A description of each program follows.

Small Unmanned Ground Vehicle (SUGV)

The SUGV is a small, lightweight, man-portable UGV capable of conducting military operations in urban terrain tunnels, sewers and caves. The SUGV could be used for reconnaissance, surveillance and application of effects, including door breach, smoke generation and delivery of concussion grenades. The SUGV's modular design allows multiple payloads to be integrated in a plug-and-play fashion. Weighing less than 30 pounds, it is capable of carrying up to 6 pounds of payload weight. Three payloads will be developed in the FCS System Development and Demonstration (SDD) phase. They include a manipulator arm, fiber-optic tether and unattended ground sensor dispenser.

The SUGV will be controlled with video feedback through an Operator Control Interface (OCI) that is being developed in cooperation with the Land Warrior Program. The FCS SUGV contractor is iRobot, located in Burlington, MA.

Multirole Utility Logistics Equipment Vehicle (MULE)

The MULE is a 2.5-ton UGV that will support dismounted operations. It consists of four major components:

- Mobility platform.
- Autonomous Navigation System (ANS). The ANS is the mission payload package that will be integrated on both the MULE and Armed Robotic Vehicle (ARV) to

provide a robotic semiautonomous capability and also on the family of manned ground vehicles (MGVs) to provide a leader-follower capability.

- OCI.
- Mission equipment packages.

The MULE is sling-loadable under military rotorcraft. The MULE has three variants: transport, countermine and the ARV-Assault-Light (ARV-A-L).

The transport MULE will carry 1,900-2,400 pounds of equipment and rucksacks for dismounted infantry squads with the mobility needed to follow squads in complex terrain. The countermine MULE will provide the capability to detect, mark and neutralize anti-tank mines by integrating a mine detection mission equipment package from the Ground Standoff Mine Detection System FCS program. The ARV-A-L MULE is a mobility platform with an integrated weapons and reconnaissance, surveillance and target acquisition (RSTA) package to support the dismounted infantry's efforts to locate and destroy enemy platforms